

**640.00 CONSTRUCTION GEOTEXTILES****General**

The term Construction Geotextiles as used here applies to the broad category of textile type materials manufactured with the purpose of being used with soils, rock, earth etc. as part of an engineered structure or system. They may be manufactured from a variety of raw materials including synthetic polymers, glass fibers or natural fibers such as cotton, jute and other plant based substances. Those made from synthetic polymers of polypropylene, polyester, polyethylene or polyamides (nylon) are known as geosynthetics. However, the term geosynthetics is commonly synonymous with the phrase construction geotextiles.

Construction geotextiles typically serve one of the following primary functions: filtration, drainage, separation, reinforcement, fluid barrier and protection. Some may serve more than one function. Their applications are usually defined by their primary function. They are identified by one or more of the following: their general class, the type of material from which they are made, their method of manufacturing and select physical properties.

The four major sub classes of construction geotextiles or geosynthetics are: geotextiles, geogrids, geomembranes and geocomposites. The vast majority of geotextiles are classified as either woven or non-woven. Woven are typically natural materials manufactured similar to other cloth making processes and are characterized by high tensile strengths, high modulus and low elongation. Non-woven geotextiles are typically synthetic polymer fibers or filaments continuously extruded then subject to being spun, blown, needle punched, heat bonded, or welded into a textile layer. They are characterized by high elongation and permeability.

Geotextiles are generally permeable materials manufactured from polymers, fibers or yarns and combined into planar, textile structures. Geotextiles are typically used in filtration, drainage and separation applications. A typical application would be to prevent soils from migrating into drainage aggregate or stop sub grade materials from penetrating into the road base. They usually allow water flow through the system.

Geogrids are permeable layers of synthetic materials used primarily for soil reinforcement. Geogrids are manufactured by a knitting or weaving process similar to the non woven methods referenced above and then coated. They have larger apertures or openings which allow the fill material on either side to interact and interlock while allowing vertical drainage of free draining soils. Hence, they act primarily to add tensile strength to the soil matrix thereby providing a more competent structural material. They are common in the construction of retaining walls and in separation and stabilization application.

Geomembranes are commonly impermeable or low permeable materials used to act as fluid barriers and to affect a seal or separation of the adjacent layers. They are used in applications requiring containment, lining, capping and sealing.

Geocomposites consists of materials that can provide two or more of the above sub class functions. Geocomposites are often used as a substitute for conventional graded aggregate or perforated pipe subsurface drainage systems. Geocomposites such as geonets, sheet drains, pavement edge drains, and prefabricated vertical drains ( PVD or wick drains) are used mainly for drainage. Geocomposites may be a single material or the same results can be accomplished using combinations of different materials together.

**Construction Requirements**

Field personnel must be properly trained to observe all phases of the construction.

Handling, storage and installation requirements must follow the contract provisions and the manufactures' written recommendations. Emphasis should be placed on ensuring material is not wrinkled or folded when laid out and the required overlaps are made. Geotextiles can be contaminated during placement so they will not drain, geogrids can experience broken grids which reduce strength and geomembranes can be punctured reducing their effectiveness as a water barrier. All seams, both factory and field, need to be checked for flaws. The inspector should note that care is taken to prevent void spaces behind or under the material and that good contact with the underlying layer is made. Also ensure that dumping damage does not occur during covering and construction equipment is not allowed to drive on the material until adequate cover has been placed over it.

For uniaxial geogrids check to ensure the strong direction, normally the roll direction, is placed in the direction as shown in the plans.

General questions should be directed to the manufacturer of the material or the geotech support units within ITD Materials. However, material and construction details changes such as those around penetrations and adjacent structures are highly dependent upon the design and any variations in these should only be done with the approval of the designer and documented by the Engineer.

**Documentation for Pay Quantities**

The diary should be used to note the activity date and acceptable completion of the work. Material description and lot numbers need to be checked to verify they match the contract requirements and the certifications which should come with the shipment. The material should be measured in the field and the pay item entered on the diary or the pay item report. Geosynthetics will be measured and reported to the nearest 1.0 SY (M2) of material in place less overlaps. Do not pay for material until certification is received.

**Reports**

Test reports as required per QA Manual Section 270.00